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PREP--A PROGRAM FOR RECOVERING AND EXTENDING ACADEMIC POTENTIAL FOR HIGH SCHOOL UNDERACHIEVERS SEEKING ENTRANCE,AT A REGIONAL COMMUNITY COLLEGE.

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*UNDERACHIEVERS, *COUNSELING PROGRAMS, COUNSELORS, *JUNIOR COLLEGES, *REMEDIAL PROGRAMS, REMEDIAL INSTRUCTION, SUMMER PROGRAMS, *TESTING, PRETESTS, POST-TESTS, HIGH SCHOOL GRADUATES, ACHIEVEMENT, LORGE-THORNDIKE TEST OF INTELLIGENCE, DAVIS READING TEST, SCHOLASTIC APTITUDE TEST, GREENFIELD, MASSACHUSETTS

THIS PROJECT WAS TO DETERMINE--(1) THE EFFECTIVENESS OF A SUMMER REMEDIAL PROGRAM IN PREPARING UNDERACHIEVING HIGH SCHOOL GRADUATES FOR SUCCESSFUL COMPLETION OF THE FIRST SEMESTER OF A 2-YEAR TERMINAL JUNIOR COLLEGE PROGRAM, AND (2) IF VOCATIONAL-PERSONAL COUNSELING HAS A DIFFERENTIATING EFFECT IN THEIR ACHIEVEMENT OF THAT GOAL. FORTY SUBJECTS WERE SELECTED WHO FAILED TO MEET NORMAL COLLEGE ADMISSION CRITERIA. A 7-WEEK REMEDIAL TREATMENT PROGRAM WAS ADMINISTERED, AFTER WHICH ALL SUBJECTS WERE ENROLLED IN A JUNIOR COLLEGE. PRE- AND POST-REMEDIATION TEST INFORMATION WAS COLLECTED. TWENTY STUDENTS WERE SELECTED FOR COUNSELING. EFFECTS OF THE PROGRAM WERE EVALUATED IN TERMS OF ACADEMIC GROWTH. STATISTICAL ANALYSIS OF DATA INDICATED THAT THE REMEDIAL PROGRAM WAS A CAUSATIVE FACTOR IN UPGRADING STUDENT SCORES ON THE LORGE-THORNDIKE TEST OF INTELLIGENCE, THE DAVIS READING TEST, AND THE SCHOLASTIC APTITUDE TEST. PERFORMANCE WAS NOT AFFECTED BY VOCATIONAL COUNSELING. ONLY 40 PERCENT OF THE PARTICIPANTS HAD FAILED BY THE END OF THE FIRST SEMESTER, WHEREAS BASED UPON ADMISSION CRITERIA, NONE OF THESE SHOULD HAVE SUCCEEDED. (HC)

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Project: PREP

A Program for Recovering and Extending Academic Potential for High School Underachievers Seeking Entrance at a Regional Community College.

JOHN J. SHEA
Author and Principal Investigator

**Grant Number OE 6-85-002,
The Vocational Education Act of 1963,
P. L. 88-210, Section 4 (c)**

**GREENFIELD COMMUNITY COLLEGE
Commonwealth of Massachusetts
GREENFIELD, MASSACHUSETTS**

JUNE, 1966

**The Project Reported Herein was
Supported by a Grant from the
U.S. Department of Health, Education, and Welfare
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SUMMARY

a) Grant Number: OE 6-85-002

b) PREP: A Program for Recovering and Extending Academic Potential for High School Underachievers Seeking Entrance at a Regional Community College.

c) Investigator: John J. Shea, School of Education
University of Massachusetts, Amherst

d) Institution: Greenfield Community College
Commonwealth of Massachusetts
Greenfield, Massachusetts

e) Duration: July 1, 1965 through June 30, 1966

f) Objectives: (a) to determine if a planned summer remedial program (PREP), inclusive of reading, English, and mathematics instruction, can prepare identified high school graduate-underachievers for success in a two-year terminal junior college program; (b) to determine if personal-vocational counseling will have a differentiating effect on this student goal achievement.

g) Procedure: The 40 participants selected from the public schools of Franklin, Hampshire, and Worcester Counties (Massachusetts) will be screened to determine that they have been unsuccessful college applicants and/or lack the requisite grades and test scores to satisfy normal college admission criteria. The persons thus identified will be voluntarily enrolled in the PREP program at the Greenfield Community College for a seven-week, 105 instructional-hour, remedial program and guaranteed admission to GCC as a full-time student for the fall semester. Pre-test and post-test objective data will be collected

on each participant. Twenty students will be selected in a random manner for the internal personal-vocational counseling treatment.

The effects of the PREP program will be evaluated by:

1. A series of pooled t-tests will be used to determine if, and where, remediation has produced academic growth on the part of the participants.

2. Analysis of variance and/or analysis of covariance techniques will be used to determine the amount of academic growth due to counseling in the remediation-counseling group having the summer session.

3. A two-phase evaluation will be used to determine the effectiveness of counseling viz. a viz.

First Semester Grade Point Average employing:

Phase I

1) A step-wise Regression procedure to predict GPA for the participants.
2) t-test on the means between Actual GPA and Predicted GPA.

Phase II

Dependent upon equality of Predicted and Actual GPA, as determined by the t-test, analysis of variance or analysis of covariance technique will be employed to determine the effect of counseling on First Semester GPA.

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THE PROBLEM

Many normally bright high school graduates are precluded from entering college because they have failed to obtain requisite skills in reading, writing, and arithmetic. That this is true is demonstrated each spring when college admissions personnel turn away young men and women in the marginal "demonstrated ability" category. One plausible solution to this program, as proposed here, is an intensive summer remedial program in which the marginal student and/or underachiever is exposed to a planned curriculum designed to enable him to build in the skill areas needed for successful collegiate performance.

A feature of this research is that its design accommodates evaluation. It will, thereby, make possible alteration in instructional content and student selection criteria for future summer programs. Its content can be replicated at this, or similar, institutions. Additionally, vocational-personal counseling can be evaluated in terms of its over-all effectiveness on a short-term exposure.

From a man power point of view: the future skills market could be brighter than is presently the case. It may well be possible to release more persons presently relegated to unskilled and/or semi-skilled positions on the basis of high school performance. The PREP project, after evaluation, could establish criteria on which to base independent post-high school evaluation (i.e. exclusive of high school performance records). A search of the literature reveals that

research concerning the effects of remediation and counseling at the junior college level is sparce. There is some indication (16) that studies of an experimental nature are being conducted but are not designed for use outside the local institutional setting. Only one report seemed to have direct meaning for this project (10). Its results were valuable but limited by the nature of the experimental group.

A recent survey of junior college administrators (16) revealed that "even though 91 per cent of the junior colleges admit ['low ability'] students, only 21 per cent have designed special courses and curriculums for them. Further, all of the literature reviewed dealing specifically with the junior college (2,3,6,9,10,13,16,19,20) points out the need for remediation and counseling as an integral part of the junior college program. This would seem consistent with the goals of the junior college, as expressed by the National Committee on the Junior Colleges (14).

The PREP project can serve as a 'bench mark' for other community colleges' efforts to determine the effectiveness of planned remediation and counseling. As is pointed out by Medsker (9), because of the wide scope of course offerings and the diversity of the student body in the American high school, "the Junior College must make such opportunity [remediation] available so that students may continue their education." This is true, as is pointed out by Miner (11), Bloom (2), and Ahmann and Glock (1), because even though predictions of success in college based on high school grades

and objective test results are good (.79 to .85), they are not sufficiently accurate (nor were they designed to be) to identify persons capable of successful performance in college <u>after</u> remediation and counseling provided by the junior college.

OBJECTIVES

It is the intent of this project to

1. determine the effectiveness of a planned remedial program in preparing marginal and/or underachieving high school graduates for successful completion of the first semester of a two-year terminal junior college program, and

2. determine if vocational-personal counseling has a differentiating effect in their achievement of that goal.

GENERAL DESIGN

1. Design. A two-group, pre-test post-test design will be used. The 40 PREP participants will be divided into two treatment groups on a random basis, and treatments will be assigned randomly. Both treatment groups will be administered the following pre-test battery:

   a) Iowa Test of Educational Development
   b) Lorge-Thorndike Test of Intelligence
   c) STEP Listening Exam
   d) STEP Essay Exam
   e) Davis Reading Test
   f) Strong Vocational Interest Test
   g) Edwards Personal Preference Schedule
   h) Mooney Problem Check List
   i) Scholastic Aptitude Test (CEEB)

One group will receive the remediation program (X_1). The other will receive remediation and counseling (X_1, X_2). At the termination of the PREP session, both groups will be administered post-tests with the same battery, using alternate forms when available.

The design may be expressed symbolically in the following manner:

$$R \begin{cases} R_1 & O_1 & X_1 & O_2 \\ R_2 & O_1 & X_1 X_2 & O_2 \end{cases}$$

Where:

R indicates random selection

O_1 indicates pre-test battery

X_1 indicates remediation group

X_2 indicates remediation-counseling group

O_2 indicates post-test battery

A one semester follow-up study will be conducted from September 1965 through January 1966 on both groups (X_1 and X_1X_2) to determine the effectiveness of the PREP program.

A limitation of this design is the absence of a control group. It is felt that because of upper limits on the number of students that can be accommodated at the Greenfield Community College, it would be impractical to enroll a control group whose chances for success would be nil without remediation.

2. Population and Sample. The 40 students to be enrolled in the PREP program will be high school graduates from commercial, vocational, college preparatory, and general curriculum who indicate a desire to continue their formal education in a terminal two-year college-level course of study. None of the students selected would be accepted for matriculation on the basis of the traditional prediction barometers (G.P.A., rank in class, SAT or CEEB scores). All will be volunteers for the remedial program and will be guaranteed entrance into the freshman class at GCC as a full-time student for the Fall semester (before they start the PREP program) contingent only upon their being in reasonable daily attendance throughout the

seven week period.

The students described above will be initially identified by:

Greenfield Community College admissions personnel

and/or

Area guidance counselors.

Final assignment to the experimental group will be determined by a screening committee composed of the principal investigator and the President of Greenfield Community College.

3. Data and Instrumentation. Three kinds of data will be collected in this project:

a. Objective pre- and post-test scores from the below listed instruments. All tests and sub-tests described give quantifiable scores.

1) Iowa Test of Educational Development (Forms A and B) will be used to determine a base for individual remedial instruction, evaluate students' accumulated knowledge and skills, and provide pertinent information for counseling purposes. All of the sub-tests are to be administered and a composite score will be computed. They are as follows:

(a) Background--Social Studies

(b) Background--Natural Science

(c) Correctness of Expression

(d) Quantitative Thinking

(e) Reading--Social Studies

(f) Reading--Natural Science

(g) Reading--Literature

(h) General Vocabulary

(i) Use of Sources

(j) Composite

2) The Lorge-Thorndike Test of Intelligence (Level 5--both forms). This group intelligence test was selected because:

(a) It is basically a power test,

(b) It yields both verbal and non-verbal scores,

(c) It is of sufficient length to measure an adequate sampling of measurable intelligence.

To be administered are:

Lorge-Thorndike Verbal

Lorge-Thorndike Non-verbal

3) Sequential Test of Educational Progress (Level 2--Alternate Forms). These tests will be especially helpful to remedial English and Reading instruction as well as providing an evaluation of students' skills for counseling purposes.

(a) <u>Listening</u> tests for the following skills:

(1) Comprehension

(2) Interpretation

(3) Evaluation and application

(b) Essay measures the student's ability to write a short explanation, letter, personal account, argument, and discussion. Results can be analyzed by Remedial English and Reading teachers for instructional purposes.

4) Davis Reading (Series 1--Alternate Forms). This test is designed to measure individual and group reading comprehension skills. The results will be especially useful to the Remedial Reading instruction but will have implications for all instructional areas. The test yields two scores for each individual and the group.

(a) Level of Comprehension

(b) Speed of Comprehension

5) Strong Vocational Interest Blank. This is an inventory of interest and preference intended to aid in predicting chances of success and satisfaction in a variety of occupations. This inventory will be especially valuable to the counselor, but its information has motivational value to instructors. No alternate form is available, so this will be a test-retest administration. Separate forms are used for Men and Women.

6) Edwards Personal Preference (test-retest). This test will be used to determine the relative

importance of fifteen key needs or motives for each individual. Results will be especially useful in counseling but have implications for remedial instruction. Standard scores are reported in the following areas:

Achievement	Dominance
Reference	Abasement
Order	Nurturance
Exhibition	Change
Autonomy	Endurance
Affiliation	Heterosexuality
Intraception	Aggression
Succorance	

7) Scholastic Aptitude Test will be used to determine both student and group basic verbal and mathematical abilities. This instrument will yield the following scores:

   (a) Verbal aptitude

   (b) Mathematical aptitude

b. <u>The Remedial Program</u> (English, reading, math) will be outlined as to content and expected instructional goals after pre-test information is available--but before the PREP program begins--by the instructional personnel. The Principal investigator will confer from time to time with the instructional staff to determine that the proposed course of study is being followed and/or if change from the original proposal

is necessary. Any changes that may occur will be recorded. Further, periodic classroom visitations shall be made by the principal investigator to observe for pre-planned instructional content.

By following this procedure, it will be possible to accurately describe the content of the remedial instruction in all subject areas.

Grade point average (GPA) for all 40 participants will be computed at the completion of their first semester at Greenfield Community College.

c. The Personal-Vocational Counseling process will be recorded for each individual in the remediation-counseling group. The number of hours of counseling exposure for each participant will be equal. The same counselor will be used for all experimental group participants.

The individual counseling sessions will have as their central theme an interpretation of appropriate objective test results (especially the Strong Vocational Interest Blank and the Iowa Test of Educational Development) by the counselor. It is the desired outcome of these sessions that counselees may make a choice in the selection of a terminal curriculum which will be both appropriate for them and compatible with the available test data.

The terminal courses offered at the Greenfield Com-

munity College are:

Business (General and Accounting), Technical, Executive Secretarial, Nursing (R.N.), Recreation, and General Studies.

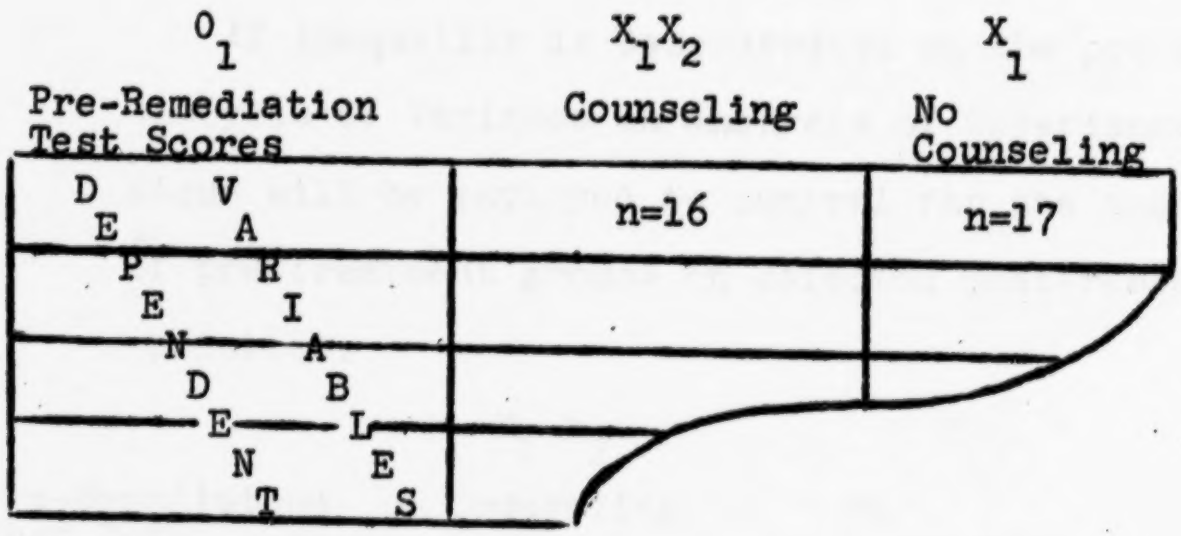
4. Analysis. The effects of the PREP program will be evaluated in the following manner:

a. Effectiveness of the Summer Remediation Program:
A series of Paired-t-tests based on objective pre-test, post-test data will be employed to determine if, and where, remediation has produced academic growth on the part of the participants..

$$t_p = \frac{\bar{d}}{s_d/\sqrt{n}}$$

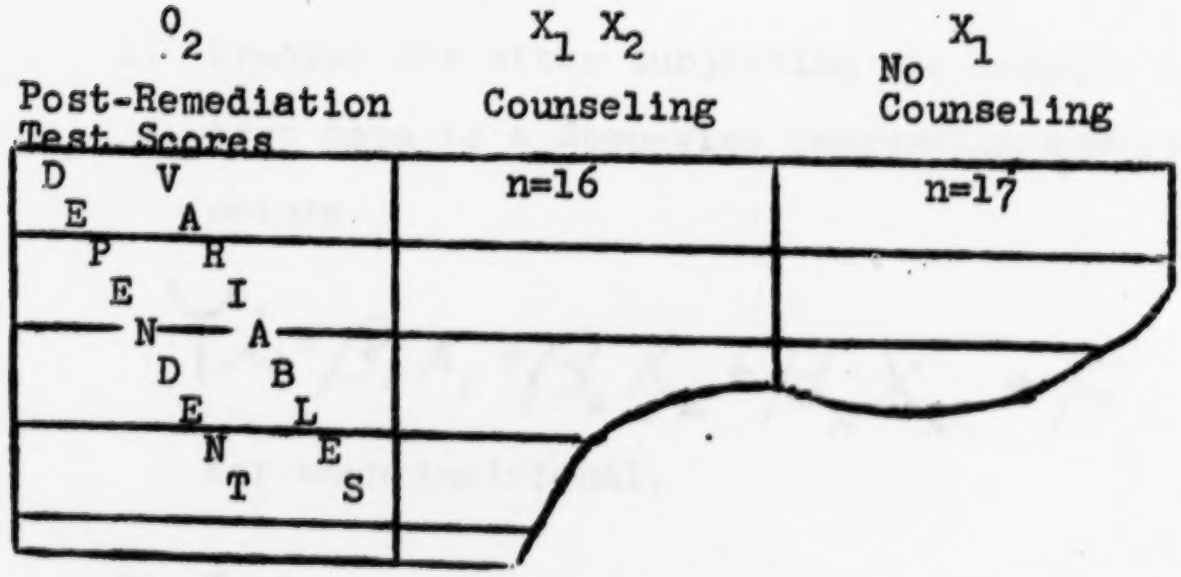
b. Differentiating effect of counseling in the summer remediation program:
Data will be analyzed in the following manner to determine whether or not the counseling treatment had a differentiating effect on the remediation process.

A two-way Analysis of Variance on pre-remediation test scores, using the counseling - no counseling dichotomy will be computed to determine the equality of these two groups.



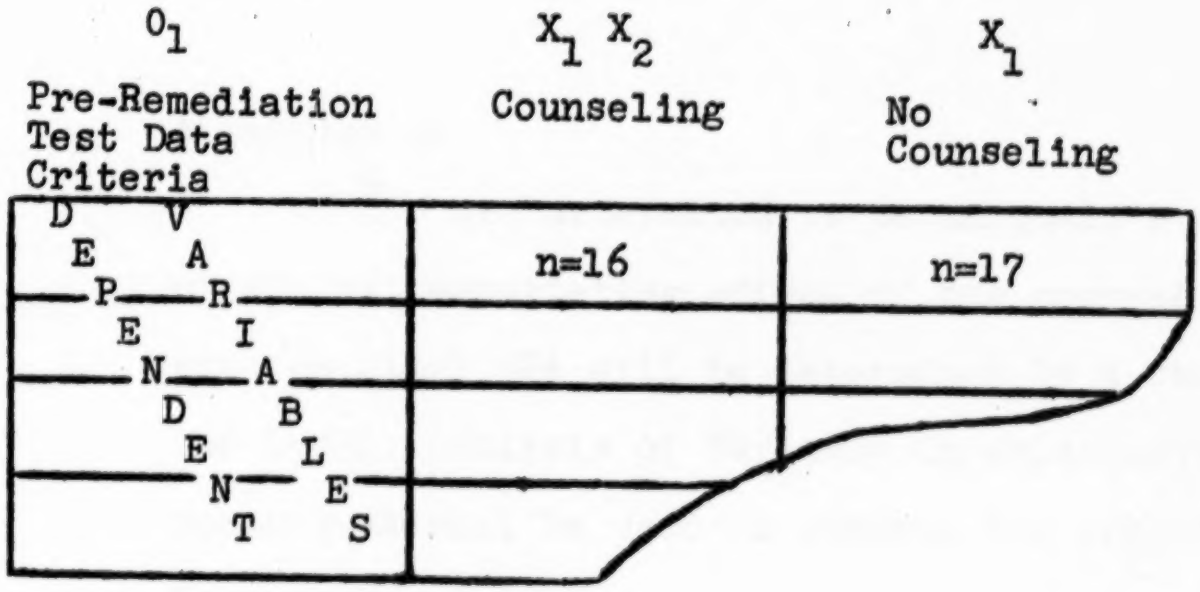
Alternate I

If inequality is not demonstrated using the two-way Analysis of Variance technique then a second two-way Analysis of Variance will be employed on the post-remediation test scores to determine if counseling has had a differentiating effect on the dependent variables.



Alternate II

If inequality is demonstrated on the pre-test Analysis of Variance an Analysis of Covariance technique will be employed to control for the inequality of pre-treatment groups on selected post-remediation variables.



c. Evaluation of the effectiveness of counseling using First Semester Grade Point Average (GPA) as the criteria for success:

1) Predict GPA after subjecting pre-remediation test data to a Step-wise Regression analysis procedure

$$Y_i = \beta_1 X_1 + \beta_2 X_2 + \beta_R X_R + \beta_0$$

for each individual.

2) Employ an appropriate t-test between Predicted GPA and Actual GPA means (X).

Alternate I

If $\bar{X}$'s are determined to be not unequal, a t-test on the Actual GPA of the two (Counseling; no Counseling) groups will be employed to evaluate the differentiating effect of the counseling treatment on final GPA.

Alternate II

If $\bar{X}$'s are determined to be unequal, evaluation of the differentiating effect of the counseling treatment on final GPA will be determined by a one-way, two-level, Analysis of Variance in which covariance techniques will be used to control for pre-treatment inequality of groups.

Criteria	X_1 X_2 Counseling	X_1 No Counseling
Predicted GPA $\bar{X}$	Actual GPA $\bar{X}$	Actual GPA $\bar{X}$

THE DIDACTIC REMEDIAL PROGRAM: Goals and Content

1. Organization.

The remedial program was conducted during a seven week summer period. The staff consisted of three instructors (English, reading, math) and a counselor.

A four (one hour lack in duration) period day was utilized: three for instructional purposes and one for library and/or student-teacher conferral. Counseling sessions for the experimental group were held in a one-and-one half hour period immediately preceding the start of the school day.

2. Statement of Instructional Goals.

It was the intent of the PREP Remedial Program that each individual enrolled would be free to be academically, and thereby personally, successful to the limit that their abilities would allow. It was felt that there was no need to heighten the failure aspect of the educational process for these young people. Instead, every effort was made by the staff to allow for academic success and positive reward. Pursuant to this end, the following working relationship was established between instructional staff and students.

First: Small classes would be conducive to the kind of intensive instruction most appropriate for remedial teaching. A ratio of twelve (12) students to one (1) instructor was established.

Second: Because of small group size, instruction was individualized for each student. Instructors were in close contact with each student. They endeavored to know the nature and intensity of the learning problem of each of the enrollees. In this manner the remediation process was paced by the instructor. A conscious effort was made to reward student progress on a daily basis. Instruction proceded at a rate that minimized individual failure.

Third: No grades, marks, or structural evaluation procedure were engaged in by the staff. Students had ample time available (one class hour and one conference hour each day) to evaluate their progress in all subject areas in direct communication with their instructors and their peers. No composite grade, mark, or structural evaluation was considered necessary as a barometer of student success or failure. This could be measured best in terms of whether or not the student was successful in the collegiate classroom. The intent of this procedure was to heighten for each student the concept that the best possible evaluation criteria is his own self-satisfaction in acquiring skills and putting them to work toward the academic goal of his choice.

3. Curriculum Outline.

A. Remedial English Curriculum
(Basic Text: English 2600)

First Week

1. Writing the descriptive paragraph:

   The topic sentence, including subject and attitude, narrowed to a specific time and place.

   Paragraph unity.

   Adequate development.

   Arriving at the specific and concrete detail.

   (These topics were hardly covered this week, but they were stressed, and will be stressed again next week, along with some additional material.)

2. Grammar review. The class was started on English 2600, each student beginning where his pre-test indicates a lack of full mastery.

3. Correction of specific mechanical errors in the student's own work.

Second Week

Paragraph writing; continuing the study of unity and adequate development, essentially repeating and enriching the first week's work.

Additional concepts:

1. Use of the detailed narrative or descriptive example to illustrate an abstract idea.
2. Use of the list of many examples to prove a general idea.
3. Detailed planning before writing.

Continued individual work in grammar.

Third Week

Coherence in the paragraph:

1. Order of
   - A. Time
   - B. Place
   - C. Climax
   - D. Logic
2. Linking words and expressions.
3. Repetition of key ideas through
   - A. Same word
   - B. Synonyms
   - C. Pronouns
4. Continuing work on grammar (English 2600) and correction of mechanical errors.

Fourth Week

Continue study of coherence in the paragraph:

1. Use of order of importance (climax).
2. Use of linking words and expressions.
3. Comparison and contrast as a basis for order:

   Point-to-point comparison within one paragraph, use of the balanced sentence for such comparison.
4. Continued study of grammar and basic mechanics as needed.

Fifth Week

1. Comparison and contrast as a basis for order:
   - A. The use of point-to-point comparison in a single paragraph.

B. Comparison in a pair of linked parallel paragraphs.

2. Sentence structure and emphasis:

   Balanced sentences for contrast.

3. Loose sentences to emphasize the idea at the beginning.

4. Periodic sentences for added emphasis of the idea at the end.

5. Outlining as a means of analyzing published essays.

6. Outlining as a technique for planning before writing.

Sixth Week

1. Use of clincher and/or topic sentences as paragraph transitions.

2. Use of descriptive (spatial) order in the essay.

3. Use of narrative (chronological) order in the essay.

4. Use of balanced sentences for point-to-point comparison and contrast in the isolated paragraph.

Seventh Week

1. Organizing and writing the essay of arguments and reasons.

2. Review.

B. The Remedial Reading Curriculum

First Week

1. Presentation of general structure of the course.
2. Preview of textbook - instruction in techniques of previewing a text.
3. Assigning recreational reading.
4. Flexibility pre-tests (speed and comprehension on easy and difficult material).
5. Pre-test on skimming a page for general significance and evaluation of difficulty--instruction in same.
6. Sentence meaning pre-test.
7. Discussion of nature of vocabulary growth - assignment of individual word collection and textbook vocabulary list.
8. Diagnostic tests in Word Attack - pronunciation, use of context and structure clues - use of dictionary.
9. Diagnostic correction of errors - assignment of individual work.
10. Pacing exercise to improve reading speed with self-recitation.
11. Introduction to Context Clues for word meaning.

Second Week

1. INTRODUCE concept of FLEXIBILITY in reading rate.
2. Individual graphs of reading speed and flexibility.
3. Types of CONTEXT CLUES to word meaning.

4. Work on SENTENCE MEANING.

   Specific vs. General statements.

5. Use of SYLLABICATION and SOUND in word attack.

6. Demonstration of relationship of EYE MOVEMENTS to rapid reading - "Peep hole" test - Eye open check.

Third Week

1. Efficient use of the Dictionary.
   (Same as listed for Section III)
   A. Spelling - Pronunciation - Choice of Definition.
   B. Inflected endings - Etymology.
   C. Principal parts - Plurals - Dictionary abbreviations.

2. Translating difficult sentences - Core words.

3. Demonstration of Eye-Span Trainer for individual use.

4. Eye-rhythm exercise.

5. Review of technique for Previewing a Textbook.

6. Diagnostic Test on Main Ideas and Relationships.

7. Introduce paragraph study.

Fourth Week

1. Continue work in expressing Main Ideas in paragraphs.

2. Use of Science Research Association Reading Laboratory.

3. Use of Power Builders (individualized program in reading comprehension).

4. How to deal with the Chapter Assignment (study technique).
5. The topic sentence approach to paragraphs.
6. Discussion of typographical clues in reading.
7. Pre-test of written recall (summerizing).
8. Review of individual Vocabulary collection (with partner check).
9. Use of Reading Accelerator.

Fifth Week

1. Discussion of SQ3R and other formulas for STUDY TECHNIQUE.
2. Exercises in thought phrasing - Eye and mind team work.
3. Functions of subordinate sentences in a paragraph.
4. Class evaluation of Summeries (written Recall Examination).
5. Tips for better concentration.
6. Using punctuation marks to aid comprehension.
7. Brief review of Use of Library (card catalog - Dewey Decimal System).

Sixth Week

1. Use of key words for rapid reading and comprehension.
   A. Through words (meaning).
   B. Signal words (structure).
2. Organizing sentences in a paragraph (scrambled).
   A, Identifying topic sentence.

B. Following sequence of thought.

C. Transitional or linking devices.

3. Reading graphic materials.

4. Organizational skills in outlining.

A. Seeing relationships of ideas.

B. Subordinating ideas.

5. Introduction to critical reading.

A. Propaganda devices.

B. Logical evaluation.

6. Paced free reading and word count.

Seventh Week

1. Drill on reading with Key Words.

2. Final check on individual vocabulary collections.

3. Quiz on Previewing a short article.

4. Final check on textbook vocabulary lists.

5. Introduction to Structural Analysis of words.
(Prefixes, Roots, Suffixes)

6. Final Speed, Comprehension test - Evaluation of graphs to determine Flexibility of rate.

7. Introduction to organization and aids to memory.

8. Final examination on concepts of reading efficiency covered in course.

9. Written evaluation of Reading PREP course.

10. Record of recreational reading completed this summer.

C. Remedial Math Curriculum.

First Week

1. Addition, subtraction, multiplication, and division of positive and negative numbers.
2. Theory of numbers.
   A. Conversion from base ten to any number base and vice versa.

Second Week

1. Elementary algebraic definitions and principles.
2. Mathematics of rational numbers.
3. Solution of first degree equations.

Third Week

1. Solution of simple first degree equations.
2. Solution of problems involving first degree equations.
3. Solution of fractional equations.
4. Solution of problems involving fractional equations.
5. Theory of decimals.
6. Introduced the study of exponents.

Fourth Week

1. Solution of first degree equations.
2. Solution of problems involving first degree equations.
3. Few fundamental operations with monomials.
4. Laws of Exponents.

Fifth Week

1. Theory of Exponents.
   A. The Exponent zero.
   B. Negative Exponents.
   C. Fractional Exponents.
2. Arithmetic Square Root.
3. Factoring.

Sixth Week

1. Solution of first degree equations.
2. Solution of verbal problems.
3. Multiplication, division, addition, and subtraction of fractions.

Seventh Week

1. Solution of verbal problems.
2. Solution of fractional equations.
3. Solution of quadratic equations.
4. Solution of equations in two unknowns.
5. Theory of straight line graphs.

ANALYSIS OF DATA AND CONCLUSIONS

The data was analyzed employing three statistical procedures. These were intended to provide a basis for judgment concerning these questions:

1. Was the Summer Remedial Program effective in producing academic growth on the part of the participants?

2. Did the personal-vocational counseling treatment have a differentiating effect on the academic growth factor viz. a viz., the recipients of that treatment?

3. Were the counseled students more successful at the completion of the first semester at the community college than were the non-counseled students?

Results of the Analysis of the Data.

I. Was the Summer Remedial Program effective in producing academic growth on the part of the participants?

Using a paired-t procedure (12)

$$t_p = \frac{\bar{d}}{s_d/\sqrt{n}} \qquad \text{where } n = 33,$$

and $t_p = 2.036$, $q = 0.05$

the following results were determined on each of the intellective pre- and post-test barometers:

PAIRED-t TEST OF SIGNIFICANCE

ON PREP INTELLECTIVE PRE- AND

POST-TEST RESULTS

TEST	$\bar{d}$ *	s_d	t_p	Level of Significance
IOWA TEST OF EDUCATIONAL DEVELOPMENT				
Background - Social Studies	-1.03	4.56	-1.30	N/S
Background - Natural Science	-0.66	3.66	-1.04	N/S
Correctness of Expression	0.81	3.98	1.17	N/S
Quantitative Expression	0.97	3.60	1.56	N/S
Reading - Social Studies	1.45	5.49	1.51	N/S
Reading - Natural Science	1.09	4.83	1.29	N/S
Reading - Literature	0.91	5.25	0.99	N/S
General Vocabulary	-0.26	2.77	0.54	N/S
Use of Sources	0.38	4.90	0.45	N/S
Composite	0.45	1.96	1.32	N/S
LORGE-THORNDIKE TEST OF INTELLIGENCE				
Verbal	2.40	4.50	3.07	.05
Non-Verbal	2.82	5.54	2.92	.05
Total	2.25	3.47	3.72	.05
SEQUENTIAL TEST OF EDUCATIONAL PROGRESS				
Listening	0.46	6.36	0.41	N/S
DAVIS READING TEST				
Level of Comprehension	4.02	6.78	3.38	.05
Speed	2.48	6.44	2.21	.05
SCHOLASTIC APTITUDE TEST				
Verbal	22.87	58.34	2.25	.05
Math	.90	46.88	0.11	N/S

*All scores derived from T-Score Conversion, except SAT (Verbal and Math) which are computed directly from SAT computed scores.

As a result of this procedure it may be concluded that after the remediation treatment the experimental group scores were significantly different on these intellective barometers:

The Lorge-Thorndike Test of Intelligence
The Davis Reading Test
The Scholastic Aptitude Test (Verbal)

The reader is cautioned not to over-interpret the above. The pre-test, post-test design employed in this study necessitated the re-administration of these same tests (alternate forms) after a four month lapse period. The test, re-test configuration is, therefore, operant.

Worthy of note is that all significant results (except the Lorge-Thorndike non-verbal subtest) were in the verbal facility category. All indications are that the remedial reading instruction was an agent of growth and that it had carry-over effect on post-test intelligence and scholastic aptitude test scores.

II. Did the personal-vocational counseling treatment have a differentiating effect on the academic growth factor viz. a viz., the recipients of that treatment?

Because of the relatively small sample size (n = 33) it was determined that a check on the random selection

assignment to the counseling - no-counseling subclass would be in order. For this purpose an analysis of variance for unequal subclass (22) procedure on each of the pre-test scores was computed to determine whether or not these two groups were, at the onset of the experimental process, significantly differed from one another on any of the available intellective or non-intellective barometers.

ANALYSIS OF VARIANCE ON PREP PRE-TEST RESULTS TO DETERMINE THE EQUALITY OF EXPERIMENTAL AND CONTROL GROUPS

PRE-TEST	F-TEST	α
Lorge-Thorndike Test of Intelligence		
Verbal	4.134	N/S
Non-Verbal	0.637	N/S
Total	3.291	N/S
Iowa Test of Educational Development		
Background - Social Studies	0.094	N/S
Background - Natural Science	1.154	N/S
Correctness of Expression	0.484	N/S
Quantitative Thinking	0.337	N/S
Reading - Social Studies	0.767	N/S
Reading - Natural Science	1.401	N/S
Reading - Literature	0.410	N/S
General Vocabulary	1.646	N/S

ANALYSIS OF VARIANCE ON PREP PRE-TEST RESULTS TO DETERMINE THE EQUALITY OF EXPERIMENTAL AND CONTROL GROUPS (CONTINUED)

PRE-TEST	F-TEST	α
Iowa Test of Educational Development (con't.)		
Composite	0.881	N/S
Use of Sources	0.167	N/S
Sequential Test of Educational Progress		
Listening	0.753	N/S
The Davis Reading Test		
Comprehension	0.025	N/S
Speed	0.790	N/S
The Edwards Personal Preference Schedule		
Achievement	0.085	N/S
Deference	2.128	N/S
Order	2.168	N/S
Exhibition	2.801	N/S
Autonomy	0.473	N/S
Affiliation	0.104	N/S
Intraception	0.937	N/S
Succorance	1.393	N/S
Dominance	0.223	N/S
Abasement	1.135	N/S
Nurturance	5.448	*
Change	1.010	N/S
Endurance	0.402	N/S

ANALYSIS OF VARIANCE ON PREP PRE-TEST RESULTS TO DETERMINE THE EQUALITY OF EXPERIMENTAL AND CONTROL GROUPS (CONTINUED)

PRE-TEST	F-TEST	α
The Edwards Personal Preference Schedule (con't.)		
Heterosexuality	0.567	N/S
Aggression	1.100	N/S
Consistency	0.116	N/S
The Scholastic Aptitude Test		
Verbal	0.179	N/S
Math	0.004	N/S

Where ... n_1 (counseling) = 16 and n_2 (no counseling)= 17

and ... $F_{\nu=1;\ \nu=31} = 4.159$, $\alpha = 0.05$

It can be concluded that significant differences do not exist between the experimental and the control groups except that (in the case of the EPPS - Nurturance) that occurrence could be expected by chance.

Because there was not a demonstrable difference between treatment groups, as indicated in the preceding analysis, a second series of similar computations was made on the PREP post-test scores to determine if, and where, the counseled students (X_1X_2) differed significantly from those that were not counseled (X_1). The results are as follows:

ANALYSIS OF VARIANCE ON PREP POST-TEST RESULTS TO DETERMINE THE DIFFERENTIATING EFFECT OF COUNSELING

POST-TEST	F-TEST	α
Lorge-Thorndike Test of Intelligence		
Verbal	3.219	N/S
Non-verbal	1.411	N/S
Total	3.238	N/S
Iowa Test of Educational Development		
Background - Social Studies	0.434	N/S
Background - Natural Science	0.053	N/S
Correctness of Expression	1.099	N/S
Quantitative Thinking	0.764	N/S
Reading - Social Studies	0.837	N/S
Reading - Natural Science	0.617	N/S
Reading - Literature	1.278	N/S
General Vocabulary	3.579	N/S
Composite	1.340	N/S
Use of Sources	0.077	N/S
Sequential Test of Educational Progress		
Listening	0.145	N/S
The Davis Reading Test		
Comprehension	0.937	N/S
Speed	0.106	N/S
The Edwards Personal Preference Schedule		
Achievement	2.642	N/S

ANALYSIS OF VARIANCE ON PREP POST-TEST RESULTS TO DETERMINE THE DIFFERENTIATING EFFECT OF COUNSELING (CONTINUED)

POST-TEST	F-TEST	α
The Edwards Personal Preference Schedule (con't.)		
Deference	0.008	N/S
Order	0.142	N/S
Exhibition	1.413	N/S
Autonomy	0.912	N/S
Affiliation	1.989	N/S
Intraception	0.520	N/S
Succorance	0.793	N/S
Dominance	0.005	N/S
Abasement	1.825	N/S
Nurturance	3.998	N/S
Change	0.159	N/S
Endurance	1.172	N/S
Heterosexuality	3.037	N/S
Aggression	0.794	N/S
Consistency	2.769	N/S
The Scholastic Aptitude Test		
Verbal	1.014	N/S
Math	2.571	N/S

Where ... n_1 (counseling X_1X_2) = 16 and n_2 (no counseling X_1) = 17

and ... $F_{\nu=1,\ \nu=31} = 4.159$, $\alpha = 0.005$

It can be concluded that significant differences do not exist between the experimental and the control group except those that may be expected to occur by chance. Therefore, the counseled students as a group did not fair better as a group than did those who received no counseling in the seven week period of the Summer Remedial Program.

III. Were the counseled students more successful at the completion of the first semester at the community college than were the non-counseled students?

In order that it could be determined whether or not counseling had a differentiating effect on First Semester Grade Point Average (GPA) the below described analytic procedure was followed.

The establishment of the pre-treatment equality of the counseling (X_1X_2) - no counseling (X_1) groups was necessitated again by the small sample size (N = 33). It was decided to predict GPA for each of the thirty-three students involved in the study. Pre-test scores and the Actual GPA for the First Semester were used in a Step-wise Regression procedure (21).

The result of this computation is:

STEP-WISE REGRESSION ON PREP PRE-TEST SCORES TO PREDICT FIRST SEMESTER GRADE POINT AVERAGE

VARIABLE	BETA ESTIMATE	T-TEST	% CONTRIBUTION TO TOTAL VARIANCE
Iowa Test of Educational Development			
Vocabulary (X_1)	0.1359	3.282	39.94
Lorge-Thorndike Test of Intelligence			
Verbal (X_2)	0.5344	2.478	6.01
Iowa Test of Educational Development			
Composite (X_3)	0.1767	2.970	9.08
Davis Reading Test			
Speed (X_4)	0.315	1.694	4.32

Where ... $R = 0.75$*

and the standard error of estimate is 0.609.

The prediction formula derived from the above data is:

$$X_{i\,j} = 0.135X_1 - 0.0534X_2 + 0.1767X_3 - 0.0315X_4 - 1.119$$

* The Analysis of Variance to test for the significance of R is:

SOURCE	SS	DF	MS	F
REGRESSION	14.651	4	3.663	9.859**
ERROR	10.032	28	.372	
TOTAL	24.683	32		

where... $\alpha = 0.01$

Using this prediction formula a First Semester GPA was constructed for each student. The table following gives those results and the student's Actual First Semester Grade Point Average.

PREDICTED AND ACTUAL GPA FOR PREP EXPERIMENTAL GROUP

STUDENT	PREDICTED GPA	ACTUAL GPA
1	0.74	0.45
2	1.23	1.91
3	1.86	2.16
4	1.49	0.00
5	0.66	1.49
6	2.01	1.99
7	1.57	0.54
8	0.09	0.25
9	1.65	2.50
10	-0.20	1.00
11	1.90	2.25
12	1.38	1.36
13	1.62	1.83
14	0.92	0.00
15	1.66	2.50
16	3.12	3.68
17	1.67	1.08

PREDICTED AND ACTUAL GPA FOR PREP
EXPERIMENTAL GROUP
(CONTINUED)

STUDENT	PREDICTED GPA	ACTUAL GPA
18	1.03	0.71
19	1.90	1.94
20	1.17	0.19
21	0.30	0.23
22	1.97	2.55
23	1.95	1.01
24	0.86	0.38
25	0.95	0.61
26	1.13	0.92
27	1.69	1.41
28	0.53	0.91
29	1.97	2.25
30	0.30	0.50
31	1.43	1.16
32	1.25	1.50
33	2.40	1.83

A t-test between the Predicted GPA mean ($\bar{X}_1$) and the Actual GPA mean ($\bar{X}_2$) where ...

$\bar{X}_1 = 1.339$, $\sigma = 0.211$ and ...

$\bar{X}_2 = 1.305$, $\sigma = 0.278$

was computed to determine pre-treatment equality.

The result of this computation was ...

$$t = 0.548$$

and at the 0.01 level was found to be not significant.

Because the Predicted GPA mean ($\bar{X}_1$) and the Actual GPA mean ($\bar{X}_2$) were proven to be not unequal a t-test (4) was computed on the Actual GPA means of the counseling ($X_1 X_2$) and no counseling (X_1) subclasses where ...

Counseling Subclass ($X_1 X_2$)	No Counseling Subclass (X_1)
$n = 16$	$n = 17$
$\bar{X}_1 = 1.49$	$\bar{X}_2 = 1.13$
$\sigma_1 = 1.02$	$\sigma_2 = 0.214$

and ... $$t = \frac{\bar{X}_1 - \bar{X}_2}{\sigma \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$$ where $$\sigma = \sqrt{\frac{n_1 s_1^2 + n_2 s_2^2}{N_1 + N_2 - 2}}$$

therefore ... $t = 1.3138.$

Because the result of the above computation was found to be not significant at the 0.05 level, it can be concluded that counseling did not have a differentiating effect on First Semester GPA.

IMPLICATIONS AND RECOMMENDATIONS

Based on available statistical evidence, it can be objectively summarized that

1. The didactic remedial program can be considered a causitive factor in upgrading the scores received by the participant-students on the Lorge-Thorndike Test of Intelligence, The Davis Reading Test, and the Scholastic Apptitude Test.

2. The above occurence was not differentially effected by the personal-vocational counseling treatment.

3. In a one semester follow-up study it has been demonstrated that personal-vocational counseling did not have a differentiating effect on participant-student Grade Poi nt Average.

Other, more subjectively based, observations and implications should be made available to the reader, however.

First, even though the counseling treatment was found to be not significant statistically at the 0.05 level pre-determined as minima for this study, it can be noted that this treatment did approach significance (0.80) in a relatively short, one semester, follow-up period. It is felt that replication of this project would be

improved by extending the counseling exposure time from two-and-one-half hours to five hours by adding five one-half hour group counseling sessions. Further, the follow-up period should be extended to include at least two semesters.

A remedial program of this type in any future replication should seriously consider a more basic mathematics program than the one described in this report. it did not service well more than one-third of the participant-students and did not differentially effect their first semester Math grade point average.

Third, further study of the post-high school identification process of students like those included in the sample of this project should be aided by the data made available here using the Smillie Step-wise Regression procedure. Work in this area may be especially fruitful in that on all of the traditional barometers of "success in college" used in the project the student-participants would not have been, except for the experimental nature of the study, admitted to college.

Fourth and last, a significant implication of this study has been a re-enforcement of the idea that traditional prediction barometers (High School scholastic average, recommendations of teachers and counselors, rank in class, Scholastic Apptitude Test results, and the like

of those) cannot be used effectively to ferret out young people the like of those described in this study viz.a viz., probable success in post-high school, two year terminal education. For, even though the counseling treatment did not differentially effect the resultant First Semester grade point average, it is noteworthy that only thirteen (13) of the thirth-three(33) participant-students, or less than 40%, did not successfully complete that semester.* The reader is reminded that theoretically none of the thirty-three (33) should have been successful.

* An informal follow-up completed at the conclusion of two semesters found that the drop-out rate increased for the participant-students from 40% to 58%. This is still not excessively greater that the two-semester institutional drop-out rate of 38% if one considers the import of the problem.

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